<u>Amendments to the Claims</u>

This listing of claims will replace all prior versions and listings of claims in the application:

<u>Listing of Claims</u>

1. (currently amended) A method to decrease emission of mercury, comprising:

selecting a factor ~~from~~ to control a combustion process to generate a flue gas comprising fly ash with enhanced <u>in situ-formed</u> unburned carbon<u>, wherein the factor is selected from the group consisting of reburning fuel, flue gas temperature, OFA injection, coal particle size, LNB flow, LNB design, combustion zone air, stoichiometric ratio of fuel, fuel/air mixing in a primary combustion zone and fuel/air mixing in a secondary combustion zone</u>;

controlling the combustion process according to ~~a~~ <u>the</u> factor ~~selected from reburning fuel, flue gas temperature, OFA injection, coal particle size, LNB flow, LNB design, combustion zone air, stoichiometric ratio of fuel, fuel/air mixing in a primary combustion zone and fuel/air mixing in a secondary combustion zone~~ to produce the flue gas comprising fly ash with enhanced unburned carbon and to vaporize mercury; and

allowing the flue gas to cool to collect fly ash with enhanced unburned carbon with absorbed mercury.

2. (original) The method of claim 1, comprising controlling the combustion process to produce a fly ash containing about 1 to about 30 weight percent carbon.

3. (original) The method of claim 1, comprising controlling the combustion process to produce a fly ash containing 3 to 20 weight percent carbon.

4. (original) The method of claim 1, controlling the combustion process to produce a fly ash containing 5 to 15 weight percent carbon.

5. (original) The method of claim 1, comprising allowing the flue gas to cool to a temperature below 450° F.

6. (original) The method of claim 1, comprising allowing the flue gas to cool to a temperature below 400° F.

7. (original) The method of claim 1, comprising allowing the flue gas to cool to a temperature below 350° F.

8. (currently amended) The method of claim 1, further comprising removing NO_x from the flue gas, wherein the process to remove NO_x from the flue gas comprises forming fuel-lean and fuel-rich zones by a fuel staging process or an air staging process.

9. (original) The method of claim 1, further comprising removing NO_x from the flue gas.

10. (original) The method of claim 1, further comprising removing NO_x from the flue gas by a low NO_x combustion technology.

11. (original) The method of claim 1, further comprising removing NO_x from the flue gas by a technology selected from low NO_x burning, reburning, air staging, fuel-lean reburning and overfire air injection.

12. (original) The method of claim 1, further comprising removing NO_x from the flue gas by forming a fuel-lean zone and a fuel-rich zone by injection of solid fuel into a post combustion zone.

13. (original) The method of claim 1, wherein the flue gas is generated from combustion of solid fuel.

14. (original) The method of claim 1, wherein the flue gas is generated from combustion of a solid fuel selected from coal, biomass, waste product and combinations thereof.

15. (original) The method of claim 1, comprising selecting a factor from the group consisting of amount of reburning fuel, flue gas temperature and OFA injection.

16. (original) The method of claim 1, comprising selecting a factor from the group consisting of coal type and particle size.

17. (original) The method of claim 1, comprising selecting a factor from the group consisting of LNB flow, LNB design, combustion zone air, stoichiometric ratio of fuel, fuel/air mixing in a primary combustion zone or fuel/air mixing in a secondary combustion zone.

18. (currently amended) [A method to decrease emissions of nitrogen oxide and mercury while decreasing carbon in fly ash] The method of claim 1, further comprising:

[selecting a combination of factors from the group consisting of fuel type, fuel staging, air staging and a combustion condition to control a combustion process to generate a flue gas comprising fly ash with enhanced unburned carbon;

controlling the combustion process according to the factors to produce the flue gas comprising fly ash with enhanced unburned carbon, NO_x and vaporized mercury;

removing NO_x from the flue gas;

allowing the flue gas to cool to a lower temperature to collect fly ash with absorbed mercury;]

passing the fly ash with enhanced unburned carbon with absorbed mercury through an ash burnout unit to remove carbon from the fly ash and to produce a mercury-containing exhaust gas; and

passing the mercury-containing exhaust gas through a collection unit to capture the mercury.

19 to 25 (canceled)

26. (new) The method of claim 1, further comprising:

passing the fly ash with enhanced unburned carbon with absorbed mercury through an ash burnout unit to remove carbon from the fly ash and to produce a mercury-containing exhaust gas;

passing the mercury-containing exhaust gas through a mercury capture reactor to capture the mercury.

27. (new) The method of claim 1, conducted without activated carbon injection.

28. (new) A method of operating a combustion furnace to decrease emission of mercury, comprising:

forming a fly ash with enhanced unburned carbon and forming vaporized mercury by (1) limiting an amount of air to the combustion furnace during combustion or by (2) fuel staging;

allowing the flue gas to cool to a lower temperature to collect fly ash comprising enhanced unburned carbon with absorbed mercury;

passing the fly ash with enhanced unburned carbon with absorbed mercury through an ash burnout unit to remove carbon from the fly ash and to produce a mercury-containing exhaust gas; and

passing the mercury-containing exhaust gas through a collection unit to capture the mercury.

29. (new) The method of claim 28, comprising forming the fly ash with enhanced unburned carbon by fuel staging comprising firing the furnace in a main burner in the combustion zone in the presence of unlimited air and injecting additional fuel for reburning in a fuel rich subsequent combustion zone.

30. (new) The method of claim 28, comprising forming the fly ash with enhanced unburned carbon by fuel staging comprising: firing the furnace in a main burner in the combustion zone in the presence of unlimited air; injecting additional fuel for reburning in a fuel rich subsequent combustion zone; and subsequently applying overfire air to burn out remaining combustibles.

31. (new) The method of claim 28, comprising forming the fly ash with enhanced unburned carbon by fuel staging comprising: firing the furnace in a main burner in the combustion zone in the presence of unlimited air; injecting additional fuel for reburning in a fuel rich subsequent

combustion zone; subsequently applying overfire air to burn out remaining combustibles; and collecting the fly ash by filtering an overfire stream at a reduced temperature.

32. (new) The method of claim 28, comprising forming the fly ash with enhanced unburned carbon by fuel staging comprising firing the furnace in a main burner in the combustion zone in the presence of unlimited air; and injecting additional fuel for reburning in a fuel rich subsequent combustion zone; wherein the additional fuel injection is controlled to provide a reduced reburning temperature between 2500 °F to 2000 °F.

33. (new) The method of claim 28, comprising forming the fly ash with enhanced unburned carbon by fuel staging comprising firing the furnace in a main burner in the combustion zone in the presence of unlimited air; and injecting additional fuel for reburning in a fuel rich subsequent combustion zone; wherein the additional fuel injection is controlled to provide a reduced reburning temperature between 2500 °F to 2000 °F to provide an enhanced carbon in fly ash content between 8% and 14%.

34. (new) The method of claim 28, comprising forming the fly ash with enhanced unburned carbon by fuel staging comprising firing the furnace in a main burner in the combustion zone in the presence of unlimited air; and injecting additional fuel for reburning in a fuel rich subsequent combustion zone; wherein the additional fuel injection is controlled to provide combustion at a reduced temperature in a range between 20% and 30% of the combustion zone temperature.

35. (new) A method of increasing mercury removal from a combustion zone without the addition of activated carbon from an outside source, comprising increasing percentage of enhanced carbon in the combustion zone fly ash to capture an increased amount of mercury and recovering the mercury from the fly ash.

36. (new) The method of claim 35, comprising increasing the percentage of enhanced carbon by combusting a feed fuel selected to provide said increased percentage.

37. (new) The method of claim 35, comprising increasing the percentage of enhanced carbon by reburning in a fuel rich zone subsequent to an initial combustion zone; wherein additional fuel injection in the fuel rich zone is controlled to provide combustion at a reduced temperature from the temperature in the initial combustion zone.

38. (new) The method of claim 35, comprising increasing the percentage of enhanced carbon by reducing amount of air to the combustion furnace during combustion to increase loss on ignition (LOI) from 5 to 15%.

39. (new) The method of claim 35, comprising increasing the percentage of enhanced carbon by identifying a fuel that provides increased loss on ignition (LOI) and using the fuel for combustion in said combustion zone.

40. (new) The method of claim 35, comprising increasing the percentage of enhanced carbon by selecting a fuel that provides increased loss on ignition (LOI) and using the fuel for combustion in said combustion zone.

41. (new) The method of claim 35, comprising increasing mercury removal from the combustion zone by at least greater than 0% to about 90% by increasing percentage of enhanced carbon in the combustion zone fly ash from at least greater than 0% up to about 15%.